Project Services Main Body

The GREAT MINDS project will serve the University of West Alabama and the surrounding community in many ways. First, the College of Education will establish the GREAT MINDS International Consortium by inviting partner institutions of higher education and P-12 education from China, South Korea, the United Kingdom, and Finland to participate in synchronous and asynchronous classroom discussions, to contribute to teaching and learning videos, and to share best practice lessons in STEM with faculty members, pre-service teachers, graduate students, and in-service teachers at UWA. The primary strategy for this international collaboration will be the establishment of a UWA telepresence classroom outfitted with Cisco communication hardware and software to allow for real-time communication with higher education and P-12 classrooms around the globe. In addition to this telepresence classroom, UWA will outfit six of its College of Education classrooms with flat-screen monitors, cameras, and microphones to create opportunities for video exchanges with partner institutions in undergraduate and graduate education courses. Also, a video and podcast repository of best practice lessons in science, technology, engineering, and mathematics (STEM) will be created using iTunes U. This conduit will allow UWA faculty and students in addition to the GREAT MINDS International Consortium partners to produce and share multimedia files in a user-friendly and universal format. iTunes U also allows UWA to create an internal site with password protection features for UWA faculty, undergraduate students, and graduate students to create lessons for STEM classroom assignments. Another component of the GREAT MINDS International Consortium will be the International Summit on STEM Teaching and Learning held during the summer at the University of West Alabama in Livingston. This conference will have both face-to-face and virtual component for the conference including keynotes featuring STEM educators from across the United States and our consortium partners, concurrent sessions presented by UWA professors and students in addition to professors and students from international institutions, and real-time and virtual poster sessions that showcase best practices in STEM lessons.

The second goal of the GREAT MINDS project is to develop and implement STEM curriculum in the training of both pre-service and in-service teachers and to address specifically critical thinking and problem solving skills. This part of the GREAT MINDS project will be done by recruiting 40 in-service teachers from the University of West Alabama service area and creating a professional learning community for the development and implementation of STEM lessons into local P-12 classrooms. Local schools have not performed as well as other schools from around the nation and world in STEM subjects as measured on standardized tests such as the NAEP, TIMMS, PISA, ARMT, SAT-10, ACT, and SAT. For this reason, the GREAT MINDS professional learning community (PLC) will bring together an annual cohort of teachers dedicated to improving science and math instruction in the West Alabama area. Teachers who wish to participate in the GREAT MINDS project must submit a completed application to the application committee which will be comprised of the Dean of the College of Education, the GREAT MINDS Project Director, the GREAT MINDS Recruiting Coordinator, the GREAT MINDS Professional Development Coordinator, and the GREAT MINDS International Consortium Coordinator. The application will require teachers to submit a current resume, an essay explaining the importance of STEM education, and a personal interview with the committee. In addition, requirements to participate include 1. Teachers must have a master’s degree. 2. Teachers must teach STEM subjects in grades P-12. and 3. Teachers must teach in a P-12 school in the West Alabama service region. Applications to participate in the GREAT MINDS project will be accepted each year in September and the annual cohort will be named by October 15 of each year. By focusing the application process on teachers in the West Alabama area, the GREAT MINDS PLC will have influence on the classroom instruction of STEM subjects in an area of the nation where most students are Black Americans who have a low socioeconomic status.

During the school year, teachers chosen to be in the GREAT MINDS PLC will be invited to the UWA campus twice a semester (four times during the academic year) to participate in high-quality, research-based professional development activities in the areas of STEM, technology integration, and 21st Century Pedagogy. The GREAT MINDS PLC will provide funds for local education agencies to hire substitutes for these professional development days. The GREAT MINDS PLC will include hands-on instruction using science kits and math manipulatives for P-12 students, technology instruction in creating online student projects in STEM subjects, and pedagogical instruction in developing critical thinking skills.

After these four meetings, participants in the PLC will attend a 5-day summer professional development camp for teachers. At the GREAT MINDS Teacher Camp, the teachers will work with UWA faculty from the College of Education and the College of Natural Sciences and Mathematics to develop lesson plans that use hands-on, inquiry-based activities to develop critical thinking skills. Each summer the GREAT MINDS Teacher Camp will focus on a specific STEM topic selected by the GREAT MINDS project director. The topics for the annual camps include forensics and biological science, environmental science, the science of flight, and robotics; mathematics will be integrated into each science topic on an annual basis through the use of measurement, statistics, and data collection. During each camp, the teachers will be instructed by STEM professionals as well as education professors in order for the participants to gain an in-depth knowledge of the topic selected. The participants in the GREAT MINDS Teacher Camp will also connect the STEM curriculum to Alabama science and math course of study standards for their grade level during the summer camp experience. The five-day intensive teacher camp will serve to prepare these STEM educators to use their knowledge with real students the following week during the GREAT MINDS Summer Day Camp for local P-12 students. After the successful completion of the GREAT MINDS Summer Day Camp for students, teachers who have participated fully in all aspects of the project will receive a $1000 stipend for the two weeks of summer professional development, a $500 voucher for a science or mathematics teaching kit to take back to their classroom, and an Apple iPad. The GREAT MINDS teachers will then continue to host UWA pre-service teachers in their classrooms for demonstration and model lessons as well as field experiences. In addition, these same teachers are expected to continue to use the STEM content and methods learned in their P-12 classrooms in West Alabama and will be asked to open their classrooms to UWA faculty and students for classroom observation.

The GREAT MINDS Summer Day Camp will be a 5-day experience open to 40 students in grades K-2, 40 students in grades 3-5, 40 students in grades 6-8, and 40 students in grades 9-12 for the four summers of the project. Students will be required to submit an application to participate in the GREAT MINDS Summer Day Camp. Students must attend a P-12 school in the West Alabama area and be recommended by a local school teacher and an administrator or two teachers. Students will be accepted to the GREAT MINDS Summer Day Camp on a first-come, first-served basis so only 40 students per age range per summer will be allowed to participate in the camp. Students may attend the GREAT MINDS Summer Day Camp for more than one summer if they meet the application requirements.

GREAT MINDS Summer Day Camp will be in session from 8:30 to 12:30 Monday through Friday of the designated camp week for specific age groups (Primary K-2, Intermediate 3-5, Middle School 6-8, and High School 9-12). The students will be divided in teams of 5-6 students and will work in a learning community with an in-service teacher and with UWA undergraduate and graduate students for an intensive hands-on learning experiences. This instruction with a very small student to adult ratio will give students to ask questions, investigate problems and solutions, and work collaboratively to solve problems. This kind of small-group teaching will be beneficial to students who need additional support in STEM areas, literacy, or numeracy.

Students at the UWA-CSI Year 1 GREAT MINDS Day Camp will solve mysteries by developing skills in forensic science, biological science, critical thinking skills, mathematics, and scientific writing. The finale of this camp will be the solving of the week-long mystery presented on Friday. Students at the It’s Not Easy Being GREEN Year 2 GREAT MINDS Day Camp will explore topics such as the Greenhouse Effect as it relates to biological, chemical, and physical science areas, using Green technology to build schools and homes of the future, creating GREEN spaces in urban and rural communities in the US and across the globe, the local GREEN food movement, and understanding the GREEN involved in economics of science. The culminating project of this camp will be group presentations on using GREEN science to improve our world. In Year 3, the GREAT MINDS Day Camp will investigate the science of flight using models including paper airplanes, hot air balloons, mag-lev vehicles, virtual flying machines, and mechanized, model airplanes. Students will use the scientific method and the principles of engineering design to create their own flying machine and showcase them on the final day of the camp. In the final year of the GREAT MINDS Day Camp, students of all ages will become robotics engineers and learn to manipulate their environments through building a robot that performs an assigned task. There will be a competition on Friday of the camp to see which team’s robot performs the best. The curriculum of all of the camps will be age-appropriate and will include science lab instruction as well as technology integration and mathematical problem solving. By reaching 160 students in the West Alabama service area each summer through the five-day camp experience, the UWA GREAT MINDS project will increase student interest and aptitude in the STEM areas. With this increased interest and aptitude, the College of Education anticipates that more students from West Alabama will choose to enter UWA to become teachers and teach the STEM subjects to students of the future.

The services of all four years GREAT MINDS Summer Day Camp will be supported by the science and math kits, probe ware, printers, microscopes (digital and light), digital large format printers, science lab supplies such as beakers, slides, etc., and laptops purchased with grant funds.

The third goal of the GREAT MINDS project is met by the Transforming Hands-on Ideas into New Knowledge or THINK Teacher Recruiting Program. The recruiting facet of this grant seeks to establish an annual cohort of Black American students (10 per cohort) from our partnership schools across Alabama to be participants in the THINK Teacher Recruiting Program. These students will be recruited through visits to local high schools and through hosted campus visits for prospective THINK students. In addition, the THINK Teacher Recruiting Program will increase enrollment by 10 per year for a total students of 40 students over the life of the grant with 75% continuing to the Teacher Education Program. Once students are on campus as UWA College of Education students, they will have the opportunity to participate in service learning projects on the UWA campus and in the Sumter County community. THINK participants will also be assigned a faculty mentor in the College of Education who will advise them in their coursework, offer psychological and personal support to them if they are first-generation college students, and offer advice about being successful in the college environment. The service learning and mentoring portions of the GREAT MINDS grant will allow the UWA faculty team to work with pre-service Black American male and female teachers for all four years of college to insure their success as a STEM educator upon graduation.

Currently at UWA, there is a disparity in the current services provided for African American, STEM and Teacher Education majors. The current programs lack the degree of project-based learning and inquiry-based learning identified with this STEM grant. Students are not pre-exposed to hands-on college based courses, collaborative and interactive efforts with the P-12 sector and UWA faculty, telepresence classroom, professional development opportunities for the local schools, and a well-defined GREAT MINDS Teacher and Summer Camp for the summer months. This STEM grant will encompass all of these efforts within the four year time span. In an effort to enhance UWA STEM courses, teachers will be engaged in best practice opportunities with universities abroad.

Global education has become the norm for the 21st century. Students should be actively engaged in internationally- focused lessons. “To strengthen our international presence, expand the global literacy of our graduates, and address the challenges for the 21st century” (McRobbie, 2008, p. 25), professors must internalize possible ways to promote internalization on campuses by way of the mission statement, program development, and education abroad. The curriculum design should be one in which students are awarded the opportunity to critically think of solutions from a multifaceted approach. With global partnerships, UWA faculty will have the opportunity to infuse STEM courses with global content. As a result, UWA students will become more fluent in cultural awareness and global education. Furthermore as stated in the Lincoln Commission, only “108 institutions (out of over 4,200 American colleges and universities) account for 50 percent of all students abroad” (CALSAP, 2005, p. 15). Moreover, education abroad is a vital initiative and this will further prepare UWA students for advancement in a global society.

This STEM project will address technology in a holistic viewpoint. The goal is to combine technology tools to deepen the pedagogical understanding of how to utilize technology to promote critical thinking, problem-solving, and collaborative learning skills in STEM courses. The activities outlined in this grant further explain how technology will be demonstrated throughout the curriculum and in summer camps. Through technology advances, project-based learning opportunities will be evident in the classrooms. Juniu (2005) mentioned that project-based learning enhances learning by having students actively engaged in activities- doing, constructing, reflecting, and visualizing the concepts.

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